

CLAIMS:

1. A method of recirculation washing of blood cells which utilizes a flexible plastic recirculation wash bag or reservoir having a top port and a bottom port in conjunction with a spinning membrane filter having an inlet port for a diluted suspension of blood cells in buffer solution, a first outlet port for filtrate and a second outlet port for a concentrated suspension of blood cells in buffer solution,

which comprises withdrawing a suspension of blood cells in buffer solution from the recirculation wash bag through the top port, mixing the suspension with additional buffer solution to form a diluted suspension of blood cells in buffer solution, feeding the diluted suspension into the spinning membrane filter through the inlet port, withdrawing filtrate comprising buffer solution from the spinning membrane filter through the first outlet port, withdrawing a concentrated suspension of blood cells in buffer solution from the spinning membrane filter through the second outlet port, feeding the concentrated suspension into the bag through the bottom port, and continuing the recirculation washing until the desired amount of washing has been achieved.

2. The method of claim 1 wherein the suspension of blood cells withdrawn through the top port of the recirculation wash bag is mixed with unwashed blood cells as well as buffer solution before feeding the diluted suspension into the spinning membrane filter.

3. The method of claim 2 wherein the unwashed blood cells include platelets, the filtrate comprises a suspension of platelets in buffer solution, and the recirculation washing is continued until the platelet content of the concentrated suspension of cells has been reduced to the desired level.

4. The method of claim 1 wherein the recirculation wash bag at the beginning of the recirculation wash procedure contains, in addition to blood cells, an antibody which specifically

binds an antigen on certain of the blood cells which, the filtrate comprises a suspension of the antibody in the buffer solution, and the recirculation washing continues until the concentrated suspension of cells contains a desired level of free of excess, unbound antibody.

5. The method of claim 1 wherein washing is continued until the fraction of starting residual has reached a predetermined value as determined by the equation:

$$FSR_i = FSR_{i-1} - (F_i / (B_i + C_i)) \times (C_i / V_i) \times FSR_{i-1} \times TA$$

where i = the discrete time interval

FSR_i = Fraction of Starting Residual at time t_i

FSR_{i-1} = Fraction of Starting Residual at time t_{i-1}

F_i = Filtrate volume moved at rate f measured at time interval $i-1$ to i in units of ml

B_i = Buffer volume moved at rate b measured at time interval $i-1$ to i in units of ml

C_i = Cell source moved at rate c measured at time interval i in units of ml, including the rate from the IsoFlow™ bag 5, as well as the rate of addition of unwashed cells, if any, in same units

V_i = cell product volume at time interval i in ml

TA = Target Admittance,

and residual is the component which the cell washing is targeted to reduce.

6. A flexible plastic bag or reservoir for recirculation washing of blood cells which has a top port and a bottom port and an integral coarse filter comprising a tube of semi-rigid plastic mesh extending from the top port into the bag.

7. A flexible plastic bag or reservoir for recirculation washing of blood cells which has a top port and a bottom port and a bubble trap at the top which comprises plastic tubing extending into the bag from the top port.

8. A flexible plastic bag for recirculation washing of blood cells which has a top port and a bottom port, an integral coarse filter comprising a tube of semi-rigid plastic mesh

extending from the top port into the bag and having a closed bottom end and a bubble trap at the top which comprises plastic tubing extending from the top port into the bag inside the mesh tube.

9. Bag of claim 8 wherein the mesh tube is sufficiently rigid that, when vacuum is pulled on the bag, causing it to collapse, the mesh tube holds an open path in the bag, so that blood cells in a buffer solution entering the bottom port can move up to the top port.

10. A disposable set for recirculation washing of blood cells comprising a recirculation wash bag which has a top port and a bottom port, a spinning membrane filter which has an inlet port for a diluted suspension of blood cells in buffer solution, a first outlet port for filtrate and a second outlet port for a concentrated suspension of blood cells in buffer solution, and a filtrate bag, plus associated tubing, including tubing for a buffer solution bag,

wherein plastic tubing connects the top port of the recirculation wash bag to a mixing zone, plastic tubing with a buffer bag spike coupler at one end is connected to the same mixing zone, the mixing zone is connected by plastic tubing to the inlet port of the spinning membrane filter, the first outlet port of the spinning membrane filter is connected by plastic tubing to the inlet port of the filtrate bag, and the second outlet port of the spinning membrane filter is connected by plastic tubing to the bottom port of the recirculation wash bag.

11. A disposable set of claim 10 wherein the recirculation wash bag has an integral coarse filter comprising a tube of semi-rigid plastic mesh extending from the top port into the bag.

12. A disposable set of claim 10 wherein the recirculation wash bag has a bubble trap at the top which comprises plastic tubing extending into the bag from the top port.

13. A disposable set of claim 10 wherein the recirculation wash bag has an integral coarse filter comprising a tube of semi-rigid plastic mesh extending from the top port into the bag and having a closed bottom end and a bubble trap at the top which comprises plastic tubing

extending from the top port into the bag inside the mesh tube.

14. The disposable set of claim 10 which also includes other bags and associated tubing for use in a magnetic cell selection instrument, including a bag for antibody suspension in buffer, a bag for peptide release agent solution in buffer, a bag for a suspension of selected cells in buffer solution, and a bag for a suspension of non-selected cells in buffer solution.